USER MANUAL

RS320 series ISO Compatible RFID STICK READER

With integral battery pack and LCD readout

Allflex EID Readers
with *Dynamic Tuning Network*™

REF 02 / Oct 2005.

Congratulations for your acquisition of an Allflex EID reader.

This device is equipped with the new "DTN - *Dynamic Tuning Network*®" technology, an exclusive Allflex innovation (patent pending).

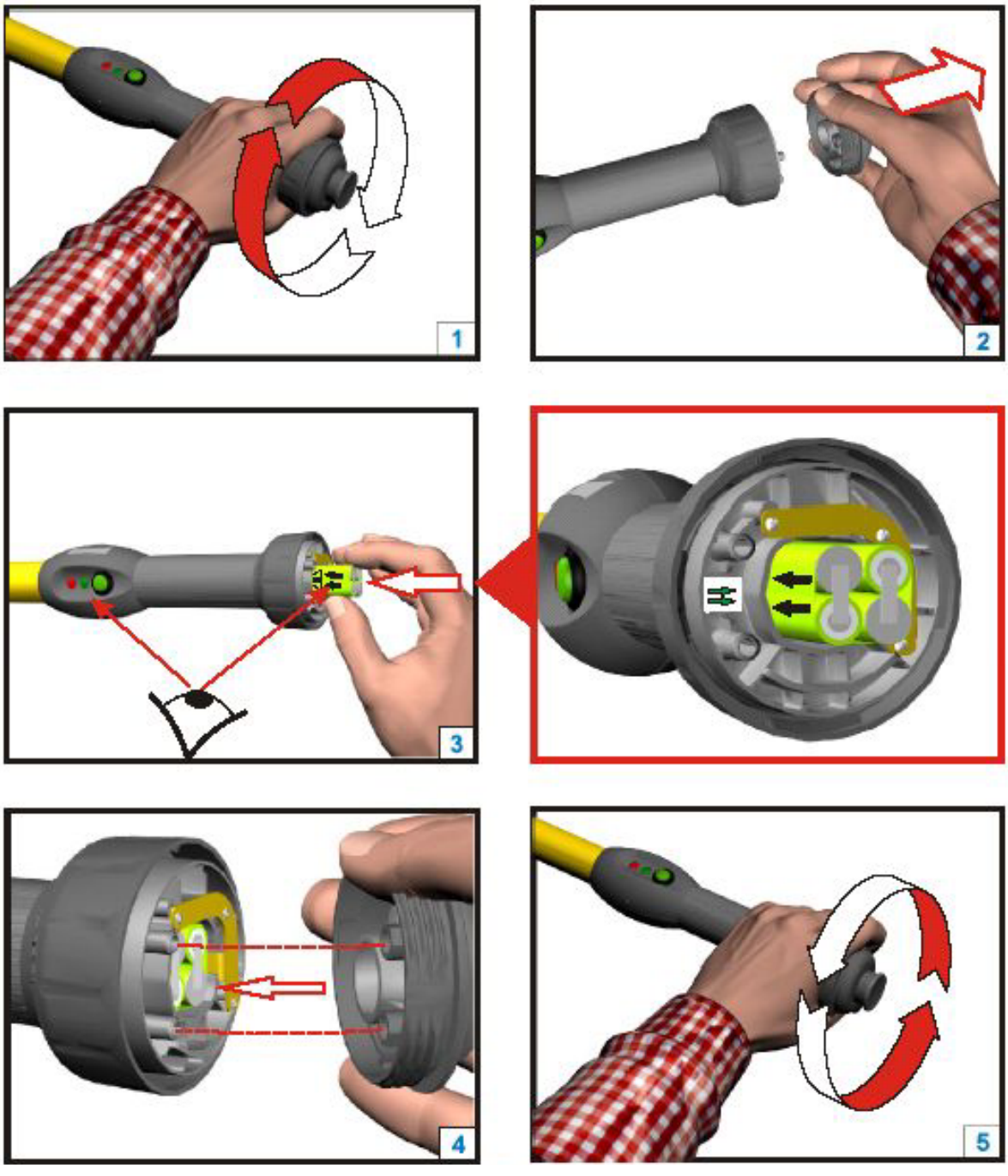
The "DTN - *Dynamic Tuning Network*™" technology provides a significant improvement of reader performance in two areas: **reading distance** and **noise immunity**. This is obtained by dynamically optimizing the electrical characteristics of the reader antenna during tag activation and reception cycles.

Readers equipped with **Allflex's *Dynamic Tuning*™ technology** deliver increased activation signal level, improved tag signal reception and improved noise immunity, together yielding improved reader performance

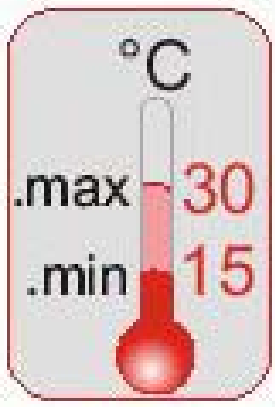
Preparing for use

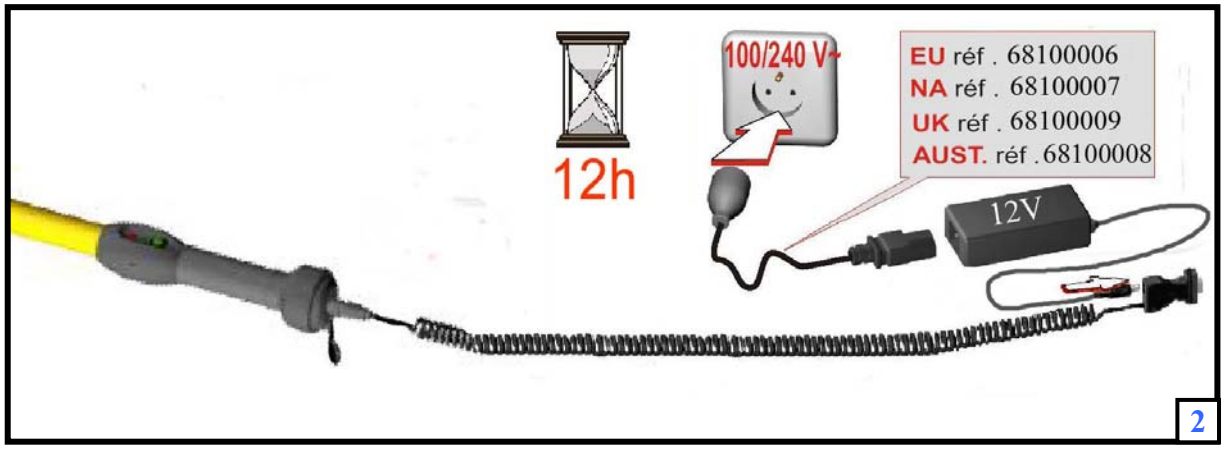
It is very important to carry out the following three steps before using the Stick Reader.

Step 1: Installing the battery pack in the Stick Reader

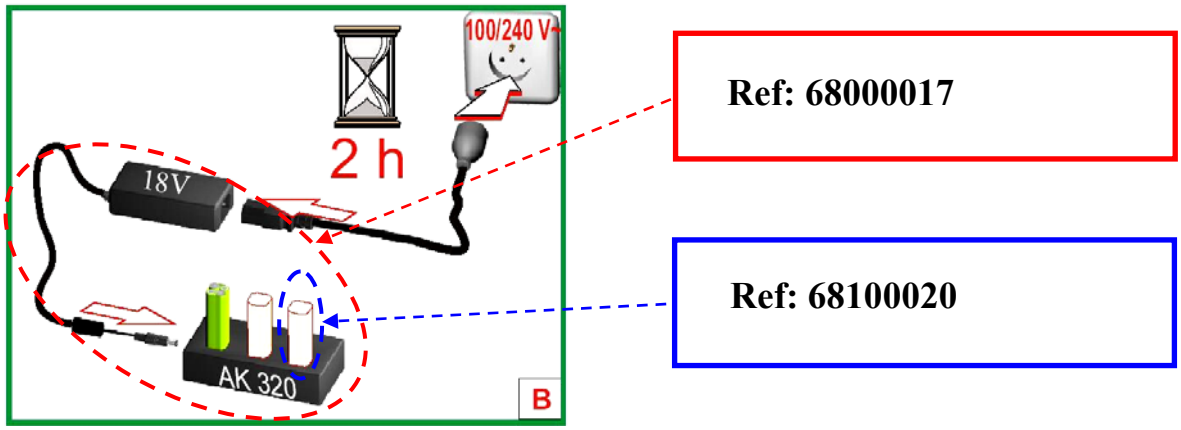


Step 2: Charging the battery pack.

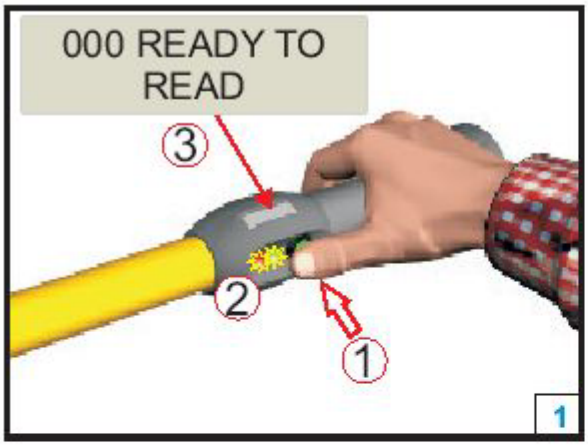


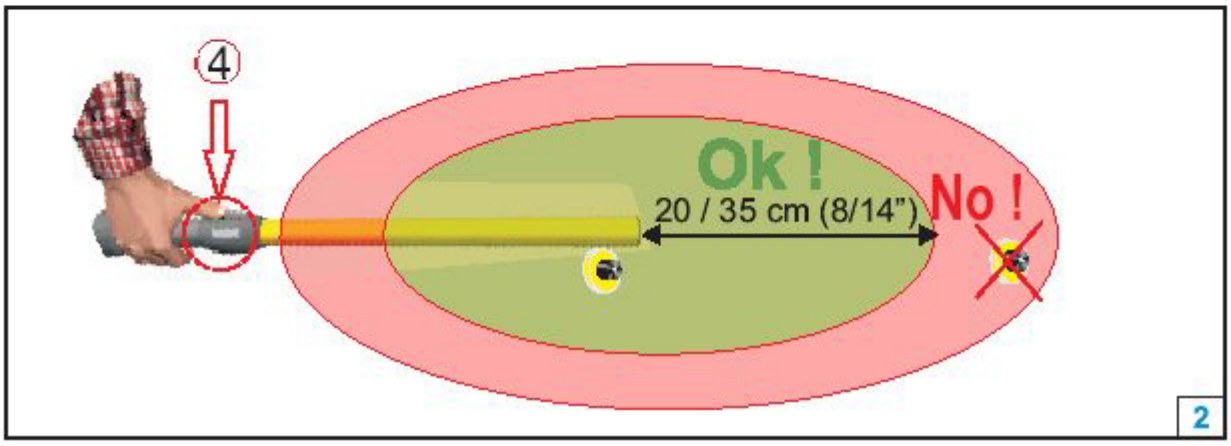


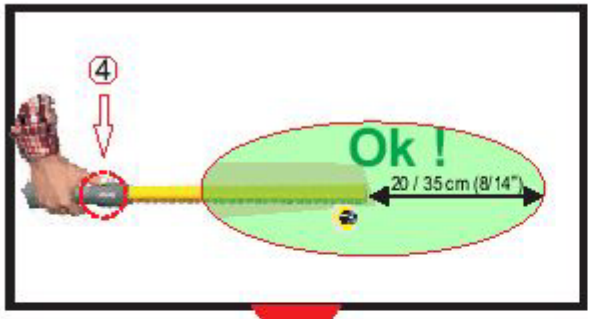
Charging option.

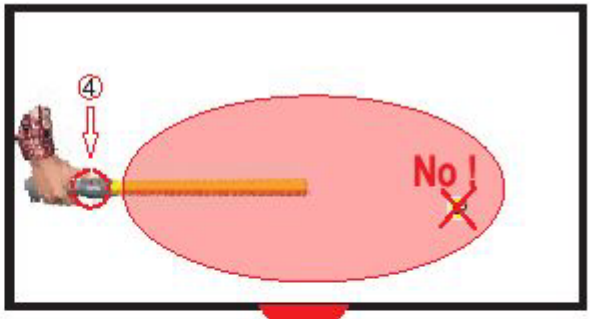


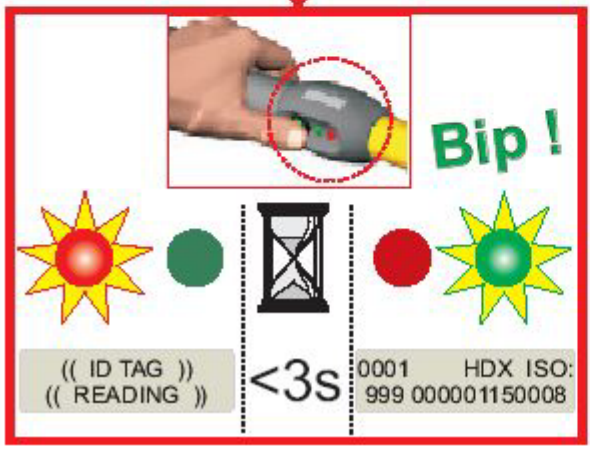
Step 3: Activating the RS320 Stick Reader and read test

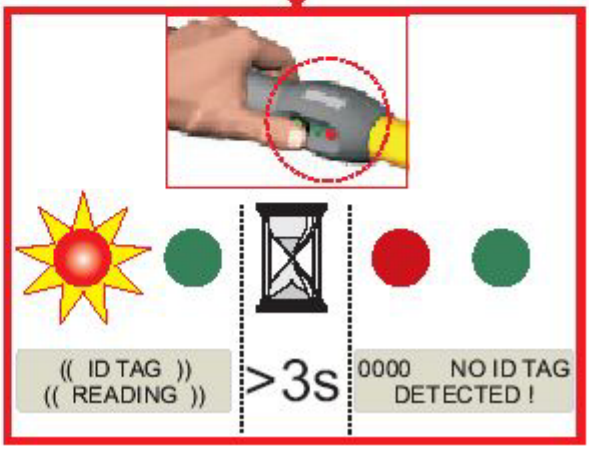












Stick Reader Power Supply

Required Power supply conditions
The RS320 Stick Reader contains a removable, rechargeable 9.6 VDC NiMH battery pack, which serves as its primary power source. Alternatively, the RS320 Stick Reader can be powered using the VAC mains charger/adapter or via any other DC source with a voltage between 9 VDC and 12 VDC that has a minimum 1A current capability, such as a 12VDC car battery or PW50/PW250 series Allflex batteries.

VAC mains adapter
The RS320 Stick Reader can be powered using the mains charger/adapter regardless of the state of charge of the battery pack. The VAC mains adapter can be used as a power source even if the battery pack has been taken out of the Stick Reader.

The Stick Reader can be used when its battery pack is being charged.

When not used for long periods
The battery pack must always be removed from the Stick Reader if it is not used for long periods. It is advisable to recharge the battery pack once every three months to preserve battery lifetime.

The Stick Reader is protected against accidental reverse polarity voltage application and will not be damaged by such.

The RS320 Stick Reader is only designed to operate with the battery pack supplied. The RS320 Stick Reader does not work with any category of disposable or rechargeable individual battery.

The Stick Reader battery pack is affected by temperature. **At 0°C, the battery pack only supplies about half its specified energy capacity.** At lower temperatures, it may be ineffective. When the RS320 Stick Reader is used at low temperatures, use an external power source such as the Allflex PW50 battery pack. In this case, we recommend placing the PW50 close to the user's body.

Do not store the battery pack and Stick Reader at temperatures above 50°C.

Recharge the battery pack every 3 months if it is not used.

Activating the Stick Reader

When the Stick Reader is powered up, the LCD readout appears as shown below:

```
0000   READY TO
       READ
```

This power-on message indicates that the Stick Reader's internal ID code memory has been cleared and that the Stick Reader is ready to read new tags. If the reader has been previously used and ID codes are stored in memory, the LCD readout will be as follows:

```
0012    HDX ISO:
982 000006975374
```

In this display, the four digits on the left of the upper line indicate the tag counter; the information located to the right of this line displays the tag type. On the lower line, the 3 characters of the ISO country code or manufacturer code are displayed, followed by the 12-digit decimal ISO national ID code.
Display formats for other tags that can be read by the RS320 Stick Reader are shown below for ISO FDX-B and industrial HDX coded tags.

```
0013    FDX-B ISO:
982  009101723121
```

```
0014   HDX-I:2048
0000000000053925
```

Reading eartags

When a tag is successfully read, the tag's ID code information appears on the LCD readout and for non-duplicate tag readings, the tag counter will be incremented and the ID code is automatically stored in the Stick Reader's internal memory. Furthermore, the Stick Reader's green LED indicator flashes and the buzzer will sound. A single flash/beep occurs the first time a tag is read and a double flash/beep indication occurs for duplicate tag reading.

Using the function menu
A menu is available on the Stick Reader that groups together 3 functions. These three functions are used: to create a field separator tag (code N° consisting of zeros); to reset the tag counter to zero; to reset the Stick Reader configuration.

To access the menu, double-click on the read button when the Stick Reader is activated. Press the read button quickly to switch to the next function.

To execute a function, press and hold down the read button. A countdown appears at the bottom left of the LCD readout and is accompanied by a beep. The function is only executed once the countdown has reached '0' and a long beep is sounded. A confirmation message is then displayed on the readout.

To quit the menu, press the read button quickly when the last function is displayed on the readout.

Function execution is cancelled if the read button is released before the countdown reaches '0'.

The Stick Reader automatically closes the menu if no action occurs for 3s.

It is impossible to read a tag when the menu is activated.

Typical reading distances for various Allflex eartags

Typical read ranges are between 20 and 40cm (8" and 16") depending on tranponder types.

Factors that affect read range performance

Tag reader efficiency is often linked with reading distance. The Stick Reader's read distance performance is affected by the following factors:

Transponder orientation - To obtain maximum reading distance, the axes of the transponder and reader antenna coils must be optimally orientated.

Transponder size - Large transponders generally have larger receiving coils that provide longer reading distances than smaller transponders.

Nearby metal objects - Metal objects located near a transponder or reader may attenuate and distort the magnetic fields generated in RFID systems and therefore, reduce reading distance.

Electrical noise interference - The operating principle of RFID transponders and readers is based on electromagnetic signals. Other electromagnetic phenomena, such as radiated electrical noise from other RFID tag readers or computer screens, may interfere with RFID signal transmission and reception and therefore, reduce reading distance.

Transponder/reader interference - Several transponders in the reception range of the reader, or other readers that emit excitation energy close by may adversely affect reader performance or prevent the Stick Reader from operating.

Discharged battery pack - As the battery pack discharges, the power available to activate the field becomes weaker and this reduced field results in a reduced reading range.

ID Code Memory

The Stick Reader has an internal non-volatile memory that can store approximately 3000 ID codes. ID codes are stored automatically when they are read. A transponder ID code will not be stored several times if the same tag is read successively several times, but it will be stored several times in memory if other tags are read in between. All the ID codes remain stored in memory when the Stick Reader is powered down. When more than 3000 ID codes are read, the new ID codes overwrite the oldest ID codes in memory, based on a wraparound technique.

Using the Stick Reader's serial interface

The Stick Reader's RS232 interface is wired as DCE (data communication equipment) and can be directly connected to the serial port of a PC or any other device that is designated as DTE (data terminal equipment). When the Stick Reader is connected to another device that is also wired as DCE (such as a Palm Pilot or Pocket PC), a "null modem" adapter is required to set up communications.

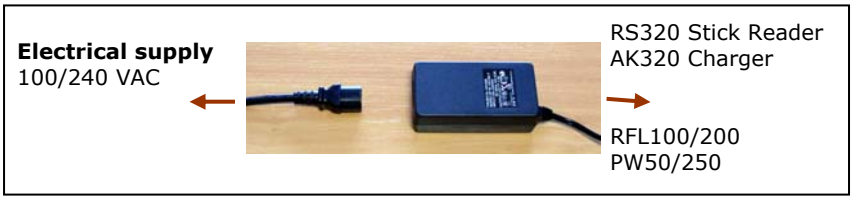
The Stick Reader's serial data connection can be extended using a standard DB9M to DB9F cable. Extensions longer than 20 m are not recommended for data and extensions longer than 2 m are not recommended for data and power. Allflex extension cables offer suitable 10 and 20-m extensions for data.

Optional accessories for the RS320 Stick Reader

IEC power cable

Ref: 68100006 (EU); 68100007(NA)
68100008(AUST); 68100009(UK)

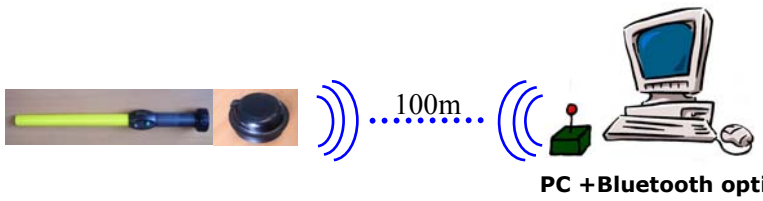
The IEC power cable is used to connect the power supply for the RS320, AK320, PW50, PW250 and RFL100/200 to the 100-240VDC mains supply. **Caution, this cable is not supplied with these items** and must be ordered separately. Select the suitable version from the 4 existing versions: EU, NA, AUST and UK.



CM301 Bluetooth® Module

Ref: 68000015

The Bluetooth® module provides wireless communication between the RS320 and a Bluetooth®-compatible device. The maximum range of this wireless link is approximately 100 m, if allowed by the Bluetooth® compatible device.



PW320 Battery Pack

Ref: 68100020

The PW320 Battery Pack is used to supply power to all versions of the RS320 Stick Reader.

AK320 Battery pack fast charger

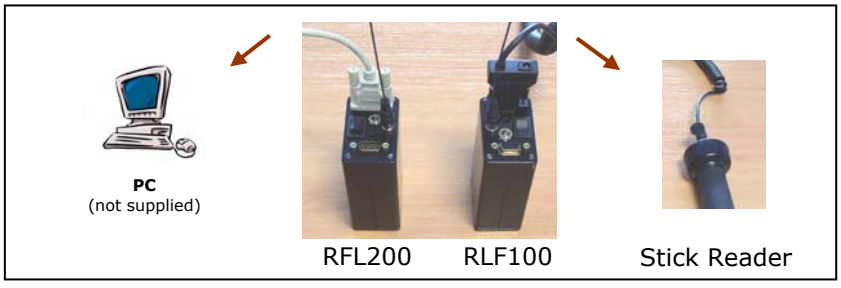
Ref: 68000017

The AK320 fast charger is used to charge up to 3 PW320 Battery Packs simultaneously in 2 hours.

RFL100 Mobile unit and RFL200 Base station

Ref: 68000008 (RFL100)
68000009 (RFL200)

The RFL100 and 200 provide wireless communications between the RS320 Stick Reader and a PC. They can also be used as a battery for the Stick Reader. The maximum range of this wireless link is approximately 150 m.

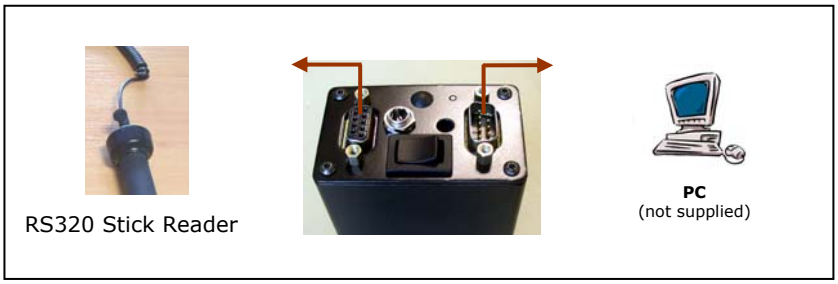


*: Not supplied with the RFL100

PW50 and PW250 Battery Pack

Ref: 68000006 (PW50)
68000005 (PW250)

PW50 and PW250 Battery Packs are portable power sources for the RS320 Stick Reader. The PW50 is a low-cost solution for 2000 eartag cycles. It can be fully recharged in 16h. The PW250 provides power for 4000 read cycles. It can be fully recharged in 10h and only requires 2.5h to be recharged to 80% capacity.

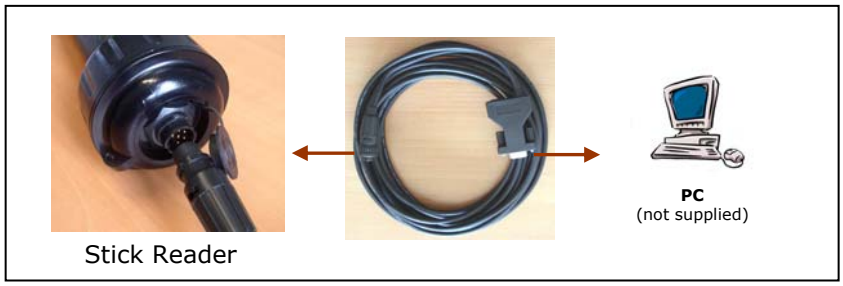


*: Not supplied with the PW50

Removable straight serial cables

Ref: 68100022 (3m); 68100027 (10m)
68100028 (20m)

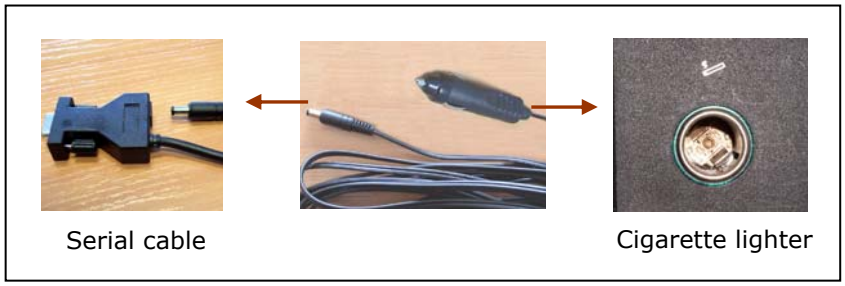
Removable straight serial cables exist in 3 lengths: 3 m, 10 m and 20 m.



12VDC cigarette lighter power cable

Ref: 68100029

This 3-m long power cable is used to supply power to the RS320 Stick Reader via a 12VDC cigarette lighter socket.



Using the Configurator® to select Stick Reader options

The Configurator® is a PC-based utility that provides users with a practical means to customise the Stick Reader's functions and format ID codes.

The Configurator® includes a user-friendly extended help function. The information given in this user manual is simply an overview.

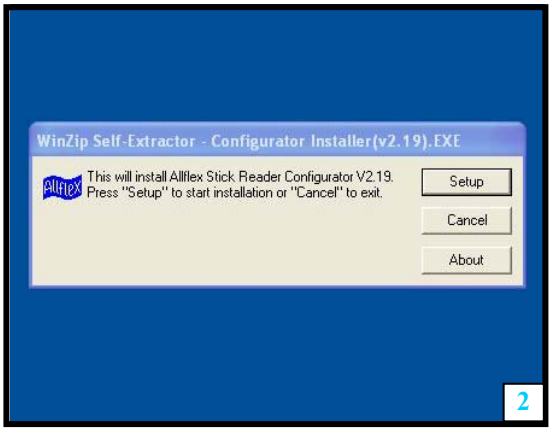
The Configurator® is supplied on a mini CD with the RS320 Stick Reader.

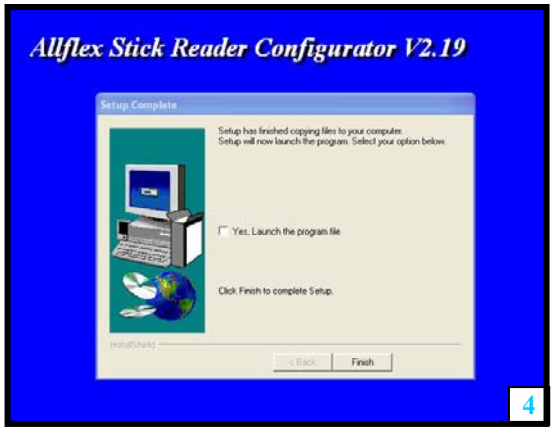
Basic operating instructions

The Stick Reader is factory-configured with the default configuration settings so that it will be immediately operational when powered up. These settings are selected to satisfy common applications for most users and should only be changed once the user has a thorough understanding of the options and their effects.

Installing the Configurator® on the PC

Insert the CD in the PC drive and follow the instructions that are displayed on the screen.

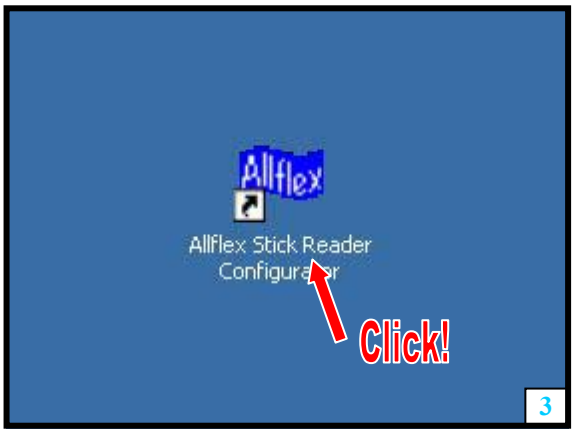


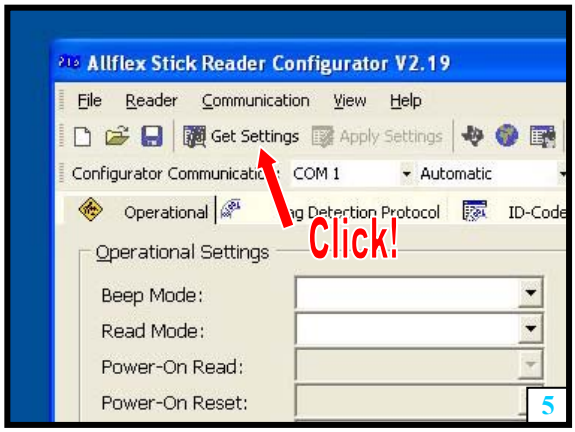


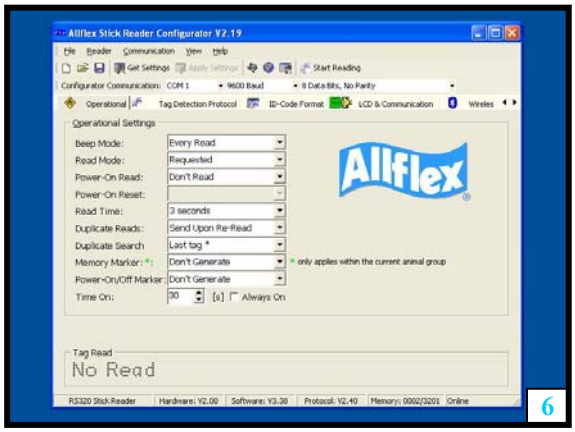
Starting the Configurator®

Connect the Stick Reader to the PC via the COM1 serial port (or any other port) and click on the 'Allflex Stick Reader Configurator' icon that is displayed on the PC screen. Power up the Stick Reader by pressing the read button and click on 'Get Settings' in the Configurator® window.

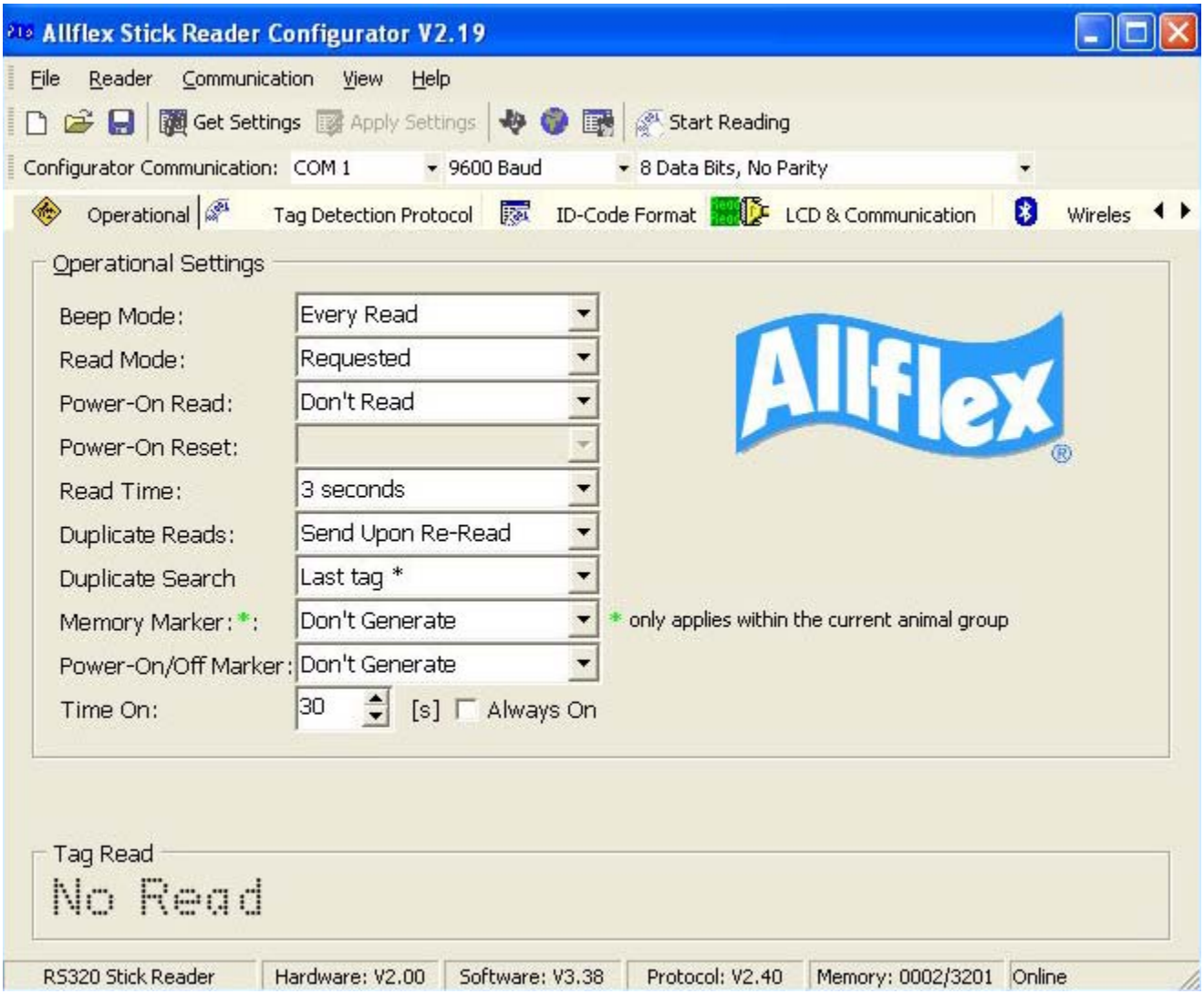
If communications are not set up automatically, check the PC's COM port to which the Stick Reader has been connected and check that this COM port is the one that appears in the dropdown menu in the third toolbar line that is entitled "Configurator Communication".







Configurator® window



Duplicate ID code search

Duplicate ID code search can be configured to suit user requirements. The search process will stop if it encounters a field separator.

Continuous read mode

In continuous read mode, the Stick Reader remains active after reading a tag ID code. The time during which the Stick Reader is active can be configured to suit user requirements. The Stick Reader's activity time countdown is initialised each time an ID code is read.

The Stick Reader's maximum autonomy is 1h15 in continuous read mode.

Do not store a Stick Reader close to a tag if continuous read mode is activated.

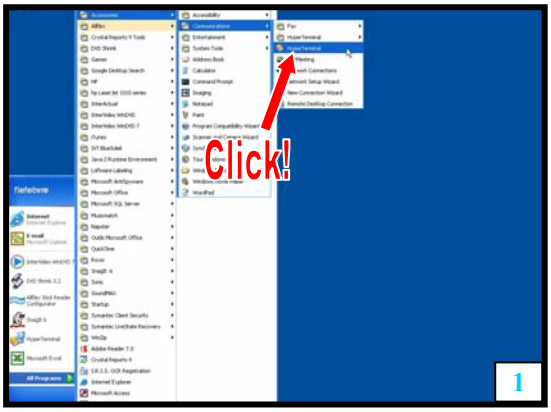
Retrieving and recording ID codes stored in the Stick Reader's memory

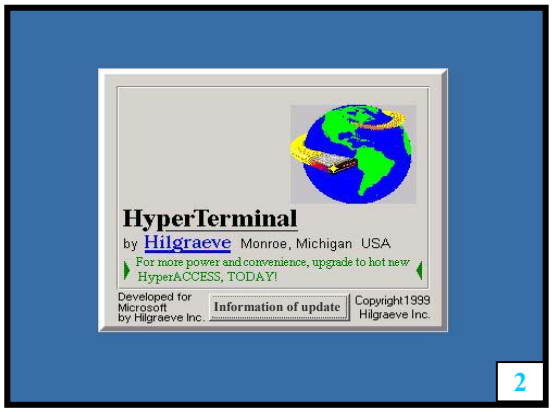
A simple ways of transferring the ID code of tag numbers stored in memory to MS-Windows® applications, such as Excel, is to download the tag numbers into HyperTerminal® first.

Configuring a HyperTerminal® connection

To do this, open a direct connection in HyperTerminal® and configure it using the COM1 port (or any other port to which the Stick Reader is connected) that is set to 9600 bits/second, 8 bits/word, no parity, 1 stop bit and no flow control (fig 4).

Once configuration is complete, begin by sending the command character P (upper case) and observe the Stick Reader's response. The number shown on the line in the format *L-nnnn indicates the number of ID codes stored in the Stick Reader, whereas the number shown on the line in the format *F-nnnn indicates the remaining number storage locations available in memory (fig5).




HyperTerminal
by Hilgraeve Monroe, Michigan USA
For more power and convenience, upgrade to hot new HyperACCESS, TODAY!
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Information of update
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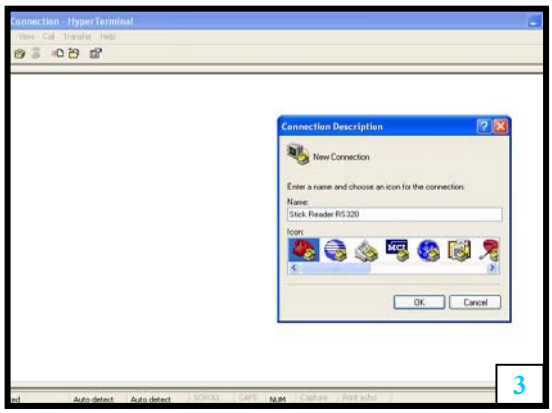
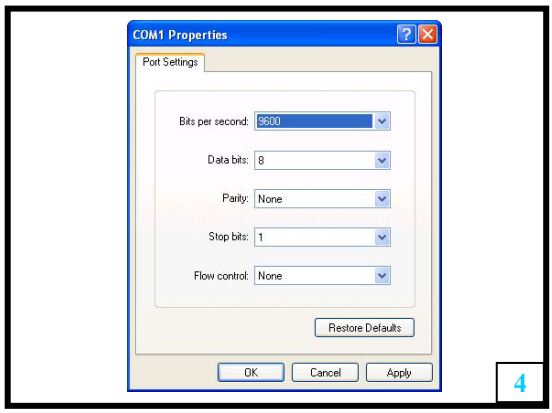
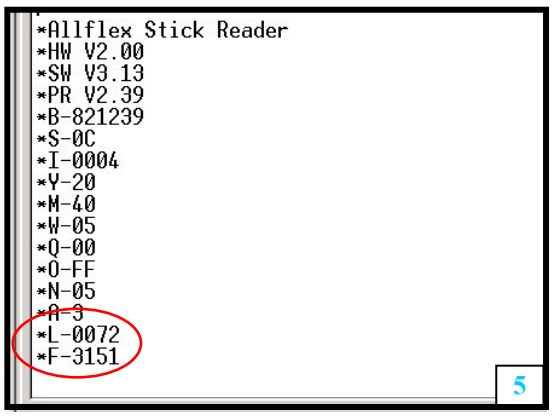
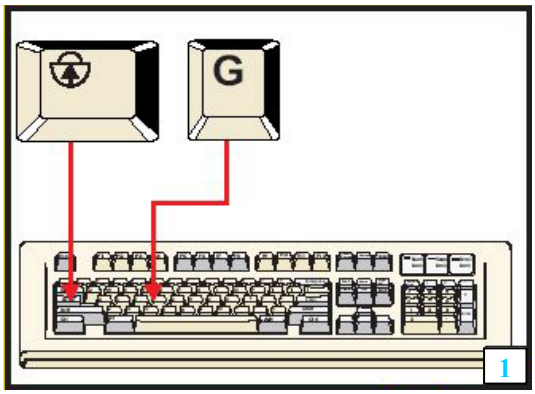


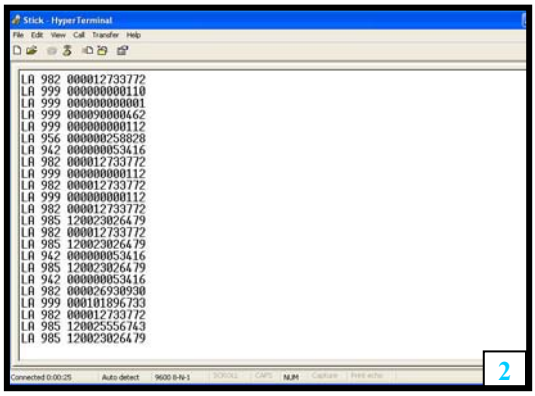




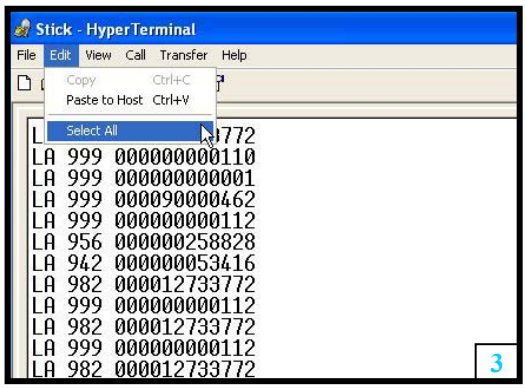
Recording ID codes – 1st method

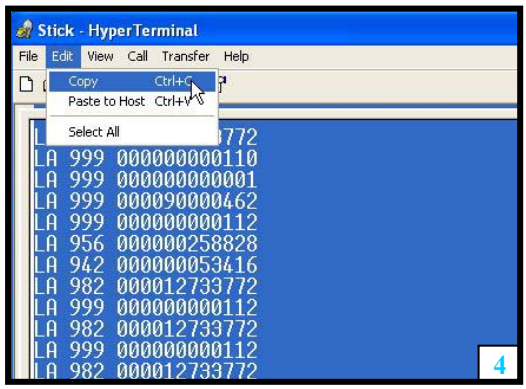
Send the 'G' command (upper case) to display the ID codes stored in the Stick Reader's memory.

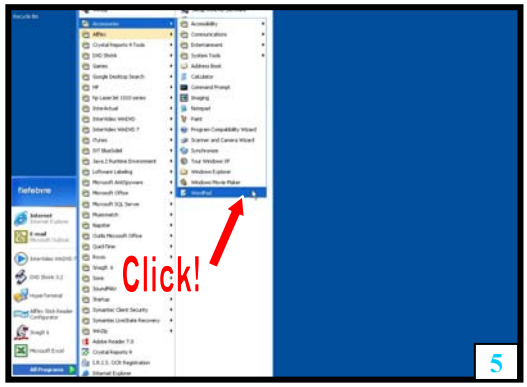


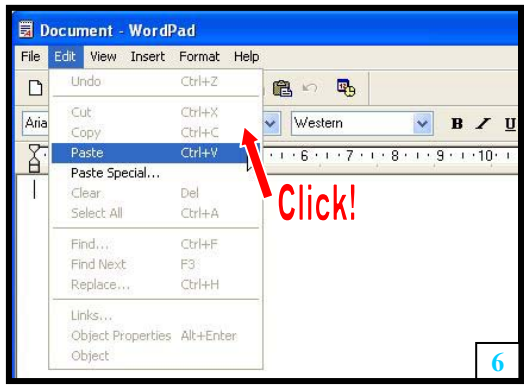


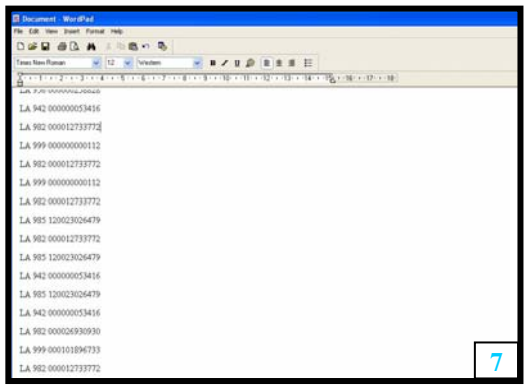
Use the 'Edit/Select all' and 'Edit/Copy' commands to copy the ID codes into the MS-Windows® clipboard. Then open the MS-Windows® notepad and use the 'Edit/Paste' command to copy the list of ID codes and then save the file in a directory using a specified filename.

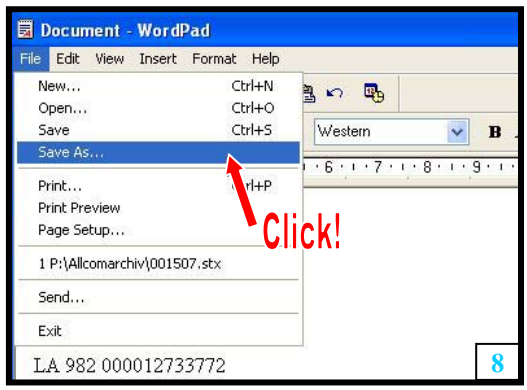






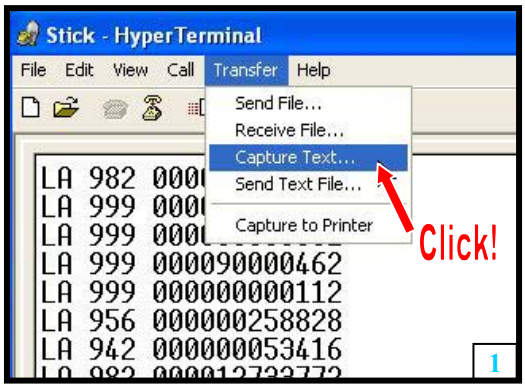


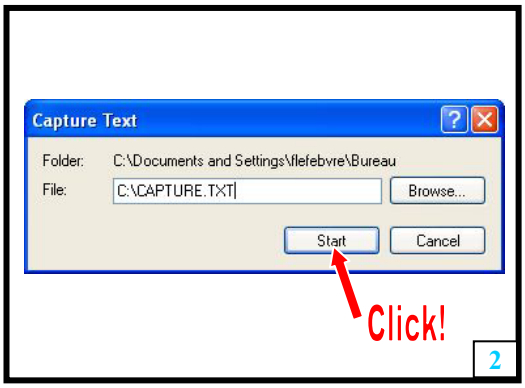


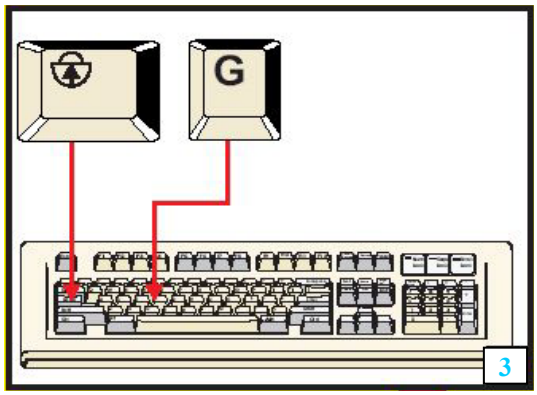


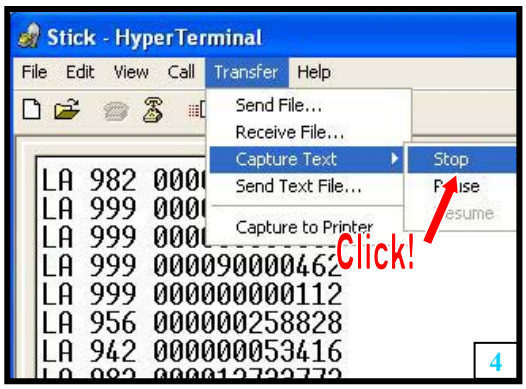
Recording ID codes – 2nd method

Use the command 'Transfer/Capture text' and save the file in a directory using a specified filename. Click on 'start' to save. Send the 'G' command (upper case) to display the ID codes stored in the Stick Reader's memory. Once the ID codes have been displayed, use the command 'Transfer/Capture text/Stop' to save the file.









If problems are encountered with HyperTerminal® or Notepad, the G command can be sent as many times as required to download the ID code memory contents. If data is imported into Excel in a format other than the format desired by the operator, it can be re-imported from Notepad using the Text Import Wizard again.

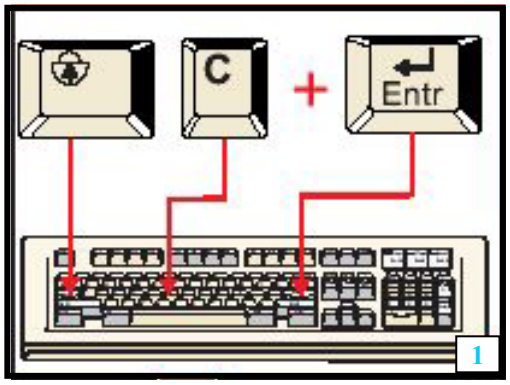
If an alternative ID code format is required, even though tag numbers have already been read and stored, it is still possible to use Configurator® to change the format and download the ID codes into HyperTerminal® in this changed form.

It is advisable to use the 2nd method to record ID codes, as the HyperTerminal® display is limited to approximately 500 lines. Only the 500 ID codes that are displayed can be saved.

Clearing the Stick Reader's memory

Once all the eartag number data has been transferred into HyperTerminal® and the number of entries has been checked against the number *L-nnnn, the temporary notepad file can be deleted. Then return to HyperTerminal® and send the C command (upper case) + {Enter} to the Stick Reader in order to clear its internal ID code memory.

The next time the Stick Reader is activated, the LCD readout will indicate 'READY TO READ' and the tag counter will be set to zero.



Caution! Once the C command + {Enter} has been sent, the ID code memory contents are lost forever. Check that the ID codes have all been obtained in the required format before erasing them and that they have been saved.

Table 1 - Frequently used command language characters

Command	Application
P	The reader's current settings are sent in command language format
Bnnnnnn	Configures the ID code serial data format
Snn	Sets serial data communication parameters
Inn	Sets the miscellaneous options
r	Resends the last tag read
R	Initiates reading (the Stick Reader must already be powered up)
G	Retrieves all the ID codes stored in memory
M	Sets ID code memory options
C{Enter}	Clears the ID code memory
? or H	Retrieves the list of valid command language characters

Note: For commands followed by "n" (hexadecimal characters), the user must press the {Enter} key on the PC after entering all the command characters. {Enter} does not need to be pressed for single letter commands, except as indicated in table 1.

Stick Reader physical integrity

The Stick Reader has been built from rugged and durable materials to withstand use in harsh environments for long periods of time. It is waterproof and can withstand immersion in water when used and to be cleaned. However, the Stick Reader contains electronic components that can be damaged if they are deliberately exposed to extreme abuse. This damage can adversely affect or stop the Reader's operation. Users should avoid deliberately striking other surfaces and objects with the Stick Reader. Damage that results from such handling is not covered by the warranty described below.

Limited Product Warranty

Allflex guarantees this product against all defects due to faulty materials or workmanship for a period of one year following the date of purchase. The warranty does not apply to any damage resulting from an accident, misuse, modification or an application other than that described in this manual and for which the device was designed.

If the product develops a malfunction during the warranty period, Allflex will repair or replace it free of charge. The cost of shipment is at the customer's expense, where as return shipment is paid by Allflex. To obtain a material return authorisation code, please call your Allflex point of sale or contact your Allflex representative.

SPECIFICATIONS

GENERAL INFORMATION

RFID compatibility:	ISO 11784 & 11785 HDX and FDX-B
Description:	Portable handheld fibreglass tube enclosure with rubber handle grip
User interface:	One "Press to Read" activation button Red LED "Exciter Active" visual indicator Audible beeper and green LED "Good Read" – Visual indicator 2x16-character LCD readout for tag number, type and counter RS232 serial data port Software upgradeable via the RS232 serial port
RS232 serial port:	1200 BPS to 57.6 kBPS (default setting 9600N81)
Serial data format	Decimal or Hexadecimal Mfr/Country code + National ID code
Memory:	Stores up to 3000 transponder codes in non-volatile memory for downloading
User options:	Non-volatile mode control options selectable via an RS232 serial port interface
Power/Data interface:	1-metre coiled cable (extends to 3 metres) or 3-metre straight cable with/DB9(f) connector and 2.5mm x 5.5mm coaxial power jack
Battery power:	Internal/removable 9.6 VDC rechargeable NiMH battery pack
AC mains adapter:	12 VDC at 1.5 A AC Adapter and battery pack trickle charger
Certification organisms:	Electromagnetic compatibility - FCC Part 15 Class A, Industry Canada RSS-210 and CISPR 22 (EN55022) and EN50082-1 Product safety - UL1950, IEC950 (CE marked)

PHYSICAL/ENVIRONMENTAL CHARACTERISTICS

Dimensions:	Length 45cm or 60 cm x diameter 32mm (18''or 24''x1.25'')
Weight:	0.62 kg. (22 ounces)
Material:	UL94V0 fibreglass and ABS UL94 HB plastic
Colour:	Yellow / Black
Operating temperature	-10ºC to +55ºC (IEC68.2.1/.2)
Storage temperature	-40ºC to +85ºC (IEC68.2.1/.2)
Humidity:	0 to 95% (IEC68.2.56)
Altitude:	-100 to +3,000 metres
Mechanical shock:	As per IEC68-2-27 (15g/11mS saw tooth) and 1-metre freefall drop onto concrete)
Vibration:	As per IEC68-2-6 (10-55 Hz sinusoïdal/0.75mm displ./1 oct/mn/10 cycles)
Protection index:	IP-67 (dust-tight/immersion) as per IEC529

RELIABILITY

Expected lifetime:	5 years, minimum

PERFORMANCE

Read distance at 9.6 VDC	Between 20 and 40 cm (8'' and 16'') depending on tag type
Reading orientation:	0º to 45º with less than 10% loss of sensitivity
Read zone:	360º in radial and axial planes with respect to the end of the reader enclosure
Interrogation rate	~ 9 times/second
Exciter signal: Field strength:	84 dBuV/m at 10 metres – with 9.6 VDC power supply

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FCC ID: NQY-930021

The device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device has been tested and meets the electromagnetic compatibility (EMC) requirements of standards EN50082-1 and EN50022 for the CE declaration of conformity (DoC) label.

Caution

This equipment has been designed, built and tested to comply with the FCC rules that regulate intentional and unintentional radiation. The user is not permitted to make any modifications to this equipment or use it in any manner that is incompatible with the methods described in this manual, without express approval from Allflex. Doing so will void the user's authorisation to use this equipment.

Other certification organism

Canada EMF Certification No. IC:4246A-RS320

Trademark notices

HyperTerminal® is a registered trademark of Hilgraeve, Inc.
MS-Windows® is a registered trademark of Microsoft, Inc.
Configurator® is a registered trademark of Allflex USA, Inc.

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